

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (previously presented) Apparatus for printing and binding a book, the latter comprising a book block having of a plurality of text pages with one edge of said book block constituting a spine, an accumulator receiving said text pages printed by said text page printer and forming said book block, said book having a cover adhesively secured to said spine, said apparatus comprising a text page printer, a cover printer, a cover transfer conveyor for receiving said cover printed by said cover printer and for conveying said cover to a binding station, a carriage movable along a workpath, said carriage being movable along said workpath from a first station at which said carriage is in position to receive said book block to an adhesive application station at which an adhesive is applied to the spine of said book block, and to said binding station, the later having a clamp for clamping said cover to said book block proximate said spine so as to effect the adhesive binding of said cover to said book block.

2. (previously presented) Apparatus for printing and binding books, each book comprising a book block having of a plurality of text pages with one edge of said book block constituting a spine, said book having a cover adhesively secured to said spine, said apparatus comprising a first text page printer, a second text page printer, a cover printer, a cover transfer conveyor for

conveying said cover to a binding station, a carriage movable along a workpath from a first station at which said carriage receives text pages for a first book block for a first book from said first text page printer to an adhesive application station at which an adhesive is applied to the spine of said first book block and to said binding station, said cover printer printing a first cover for said first book, said cover conveyor conveying said first cover to said binding station, the latter having a clamp for clamping said first cover to said first book block proximate said spine so as to effect the adhesive binding of said first cover to said first book block, said second text page printer located along said workpath at a location separate from said first text page printer for printing a second book block for a second book, said cover printer printing a second cover corresponding to said second book and said cover conveyor conveying said second cover to said binding station after binding of said first book, said carriage being movable to a position along said workpath for receiving said second book block printed by said second text page printer and thence being movable along said work path to said adhesive application station for having said adhesive applied to said spine of said second book block and thence to said binding station for being bound to said second cover.

3. (previously presented) Apparatus for printing books and for perfect binding said books, each said book to be printed and bound having a book block comprising a plurality of text pages and a cover corresponding to said book being

printed, one edge of said book block constituting a spine, said apparatus comprising:

a computer control system processing information relating to a first book to be printed and bound, said information including the size of the book and the number of pages in said book block, information corresponding to the text pages to be printed and to the cover to be printed, and information relating to excess margins of the bound book that must be trimmed to form a book of predetermined finished size;

a text page printer;

a text page accumulator that receives said text pages from said text page printer so as to constitute said book block for said book being printed;

a cover printer;

said computer control system initiating printing of text pages by said text page printer for said first book and initiating printing of a cover for said first book by said cover printer, said accumulator accumulating said text pages for said first book so as to form said book block for said first book;

a carriage movable along a work path, said work path having a book block receiving station, an adhesive application station, a binding station, and a trimming station therealong;

said carriage receiving said first book block;

a cover transfer conveyor that conveys said cover for said first book from said cover printer to said binding station;

upon the completion of the printing of said first book block, said computer control system initiating transfer of said first book block from said accumulator to said carriage at said book block receiving station and initiating movement said carriage along said work path to said adhesive application station for the application of adhesive so as to be disposed between the spine of said first book block and a center portion of its respective cover upon binding of said book, said computer control system effecting the positioning said first book block at said binding station with respect to its respective said cover positioned at said binding;

said binding station having a clamp engageable with said cover of the book proximate said spine for clamping said cover around said spine of said book with a center portion of said cover adhesively secured to the spine of said book block; and

after binding of said cover to said book block so as to form a perfect bound book, said computer control system further initiating movement of said carriage along said workpath to a trimming station, said computer control system effecting operation of a selectively actuatable trimming blade for trimming said excess margins, if any, of said bound book along one or more edges thereof so as to form said book of a predetermined finished size.

4. (previously presented) Apparatus for printing a plurality of books one after the other, for perfect binding each of said books, and for trimming each of said books to a predetermined finished size, each said book to be printed and bound having a book block comprising a plurality of text pages

and a cover corresponding to said book being printed, one edge of book block constituting said spine of said book block, said apparatus comprising:

a computer control system processing information relating to each of the books to be printed, bound, and trimmed, said information relating to a first book including the finished size of a first book, the thickness of said first book, information corresponding to the text pages to be printed and to the cover to be printed for said first book, and information regarding excess margins that must be trimmed from said first book as initially printed and bound so as to be of a predetermined finished size, said computer control system processing information relating to a second book including the finished size of a second book, the thickness of said second book, information corresponding to the text pages to be printed and to the second cover to be printed for said second book, and information regarding excess margins that must be trimmed from said second book as initially printed and bound so as to be of a predetermined finished size;

a first text page printer which prints said text pages for said first book;

a cover printer;

a second text page printer which prints said text pages for said second book;

a first tray receiving said text pages printed by said first text page printer, said text pages being accumulated on said first tray for constituting said a first book block;

a second tray receiving said text pages printed by said second text page printer, said text pages being accumulated on said second tray for constituting said a second book block;

a carriage movable along a work path, the latter having a first station at which said carriage receives said first book block, an adhesive application station at which an adhesive is applied so as to be disposed between said spine of a book block carried by said carriage and its respective cover, a binding station at which said book block carried by said carriage is bound to its respective cover positioned at said binding station, the latter having a clamp for clamping a cover to a book block proximate the spine of the book block, a trimming station at which excess margins of the book bound at said binding station are trimmed from along one or more edges of said book, and a second station at which said carriage receives said second book block;

a cover conveyor that receives said cover printed by said cover printer and that conveys said cover to said binding station;

said computer control system effecting printing of said text pages for said first book block by said first text page printer and initiating printing of a first cover for said first book by said cover printer;

said computer control system effecting printing of said text pages for said second book block by said second text page printer;

upon the completion of the printing of said text pages for said first book block by said first text page printer, said computer control system effecting the transfer of said first book block from said first tray into to said carriage;

said computer control system effecting conveying of said first cover from said cover printer to said binding station with a center portion of said first cover positioned at said binding station so as to be in register with the spine of said first book block when the latter is positioned at said binding station;

 said computer control system effecting the printing of a second cover for said second book;

 said computer control system further initiating movement of said carriage along said work path to said adhesive application station where a suitable adhesive is applied so as to be between said spine of said first book block and said first cover upon binding said first book;

 said computer control system effecting stopping said carriage at said binding station such that with said spine of said first book block is substantially in register with respect to said first cover, said first cover is clamped to first book block proximate the spine thereby to form a first bound book;

 said computer control system further effecting the transport of said bound first book to said trimming station, said first bound first book having said excess margins known to said computer control system, the latter effecting operation of a selectively actuatable trimming blade at said trimming station for trimming said excess margins along one or more edges of said first bound book thereby to form said first book of said predetermined finished size;

 upon the transport of said first bound book to said trimming station, said computer control system effecting movement of said carriage to said second position;

said computer control system effecting the transfer of said second book block from said second tray to said carriage;

 said computer control system effecting the transfer of said second cover from said cover printer to said binding station;

 said computer control system effecting movement of said carriage along said work path from said second position to said adhesive application station where a suitable adhesive is applied so as to be between said spine of said second book block and said second cover upon binding of said second book;

 said computer control system effecting stopping said carriage at said binding station such that said spine of said second book block is in register with respect to said second cover and effecting clamping of said second cover to said second book block proximate the spine thereof thereby to form a second bound book; and

 said computer control system further effecting the transport of said bound second book to said trimming station, said second bound book having said excess margins known to said computer control system, the latter effecting operation of said trimming blade for trimming said excess margins along one or more edges of said second bound book thereby to form a second book of said finished predetermined size.

5. (previously presented) A book printing and binding apparatus, said book having a plurality of text pages constituting a book block and a paper cover, said apparatus comprising:

 a book printing station that prints said text pages;

a carriage that receives said book block, said carriage holding said book block in a known position;

an adhesive station operatively associated with the carriage to apply an adhesive to one edge of the book block, said one edge constituting a spine;

a cover printing station that prints a cover for said book being printed;

a binding station receiving said cover;

said binding station cooperating with said book block carried by said carriage such that with said carriage stopped at said binding station such that said book block is substantially centered with respect to said cover;

said binding station further including a clamp engageable with said cover and with said book block proximate said spine for clamping said cover to said book block such that said adhesive binds said cover to said book block along said spine thereby to form a bound book; and

a trimming station operatively associated with said carriage receiving said bound book and trimming said bound book to predetermined finished dimensions.

6. (canceled)

7. (previously presented) A book printing and binding apparatus as set forth in Claim 5 further comprising:

a conveyor extending from said book printing station to said adhesive application station and to said binding station, said carriage being operatively connected with the conveyor to be conveyed by the conveyor from said book

printing station to said adhesive station and to said binding station.

8. (previously presented) A book printing and binding apparatus as set forth in Claim 5 wherein said clamp at said binding station is movable between first and second positions wherein the first position the clamp is clear of said cover, and wherein the second position the clamp is in clamping engagement with said cover proximate said spine so as to forcibly clamp said cover to said book block.

9. (previously presented) A book printing and binding apparatus as set forth in Claim 5 wherein said cover printing station includes a color cover printer that prints a color cover for the book and ejects said cover, said cover printing station further including a cover transfer mechanism extending between said cover printer and the binding station, the cover transfer mechanism being operable to receive the printed cover ejected from the cover printer and to transfer the cover to the binding station.

10. (previously presented) A book printing and binding apparatus as set forth in Claim 9 wherein said cover transfer mechanism positions said cover at said binding station with a central portion of said cover in register with the spine of a book block carried by said carriage to be bound to said cover.

11. (previously presented) A book printing and binding apparatus as set forth in Claim 5 wherein said trimming station has a nest that receives and holds said bound book, said book being delivered to said nest by said carriage such that the bound book is in a known position, said trimming station having a

shear blade operable to shear said bound book, the nest and said shear blade being movable relative to one another enabling said shear blade to shear predetermined amounts of the book block and cover along one or more edges thereof so as to form a finished book of predetermined dimensions.

12. (previously presented) A book printing and binding apparatus as set forth in Claim 11 wherein said nest is rotatable relative to said shear blade to present more than one edge of both the book block and cover to said shear blade for shearing.

13. (previously presented) A book printing and binding apparatus as set forth in Claim 5 wherein said carriage has a bottom opening such that a book block carried vertically by said carriage has its spine exposed from below such that as the carriage carries the book block spine over the adhesive station adhesive may be applied to said spine.

14. (previously presented) A book printing and binding apparatus as set forth in Claim 13 wherein with said spine exposed through said bottom opening in said carriage, with the book block positioned at said binding station, said spine is in position to be adhesively bound to said center portion of said cover positioned at said binding station.

15. (previously presented) A book printing and binding apparatus, said book having a plurality of text pages constituting a book block and a cover, said apparatus comprising:

a first book printing station that prints said text pages to form a book block
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for a first book;

a carriage holding said book block for said first book;

an adhesive station operatively associated with the carriage to apply an adhesive to one edge of the book block for said first book, said one edge of said book block constituting a spine;

a cover printing station that prints said cover for said first book;

a binding station receiving said cover for said first book, said binding station cooperating with said book block carried by said carriage so as to bind said book block and said cover so as to form said first book;

a second book printing station that prints text pages for a second book block for of a second book;

said carriage being operatively associated with said second book printing station to receive said second book, said carriage holding said second book block with one edge of this last-said book block constituting its spine;

said carriage conveying said second book block to said adhesive station for having adhesive applied to its spine, and thence to said binding station;

said cover printing station printing a second cover for said second book;

said binding station receiving said second cover for said second book;

said carriage positioning said second book block at said binding station with its spine in position to be bound to said second cover; and

said binding station being operable to bind said second cover to said second book block thereby to form said second book.

16. (previously presented) A book printing and binding apparatus

as set forth in Claim 15 wherein said second book printing station is separate from the first book printing station.

17. (previously presented) A book printing and binding apparatus as set forth in Claim 16 wherein said carriage is movable along a workpath along which is included said adhesive application station and said binding station, wherein said first book printing station and said second book printing station are positioned on opposite ends of said workpath with respect to said adhesive station and said binding station.

18. (previously presented) A book printing and binding apparatus, said book having a plurality of text pages constituting a book block and a cover, said apparatus comprising:

- a book printing station that prints said text pages;
- a carriage that receives said book block;
- an adhesive station operatively associated with the carriage to apply an adhesive to one edge of the book block received in said carriage, said one edge of said book block constituting a spine;
- a cover printing station that prints a cover for said book being printed ;
- a binding station receiving said cover;
- said binding station cooperating with said carriage such that with said carriage stopped at said binding station such that said book block is in register with said cover;
- said binding station further including a clamp engageable with said cover

and with said book block proximate said spine for clamping said cover to said book block such that said adhesive binds said cover to said book block along said spine thereby to form a bound book; and

a transfer mechanism between said book printing station and the carriage to receive said text pages printed by said printing station and to form said first book block, said transfer mechanism being operable to transfer said book block to said carriage.

19. (previously presented) A book printing and binding apparatus as set forth in Claim 18 wherein said transfer mechanism has a tray that receives said text pages from said book printing station so as to form said first book block.

20. (previously presented) A book printing and binding apparatus as set forth in Claim 19 wherein with said carriage in position to receive said book block, said tray being movable from a receiving position in which it receives said pages from said printing station to a delivery position in which said book block is delivered to said carriage.

21. (previously presented) A book printing and binding apparatus as set forth in Claim 20 further having a vibrating mechanism mounted on said tray for vibrating the tray and said text pages received thereon so as to arrange said pages into a book block.

22. (previously presented) A book printing and binding apparatus as set forth in Claim 20 further comprising a clamp mechanism on the tray movable between open and a closed position where in the closed position the

clamp holds the book block on the tray and where in the open position the clamp releases the book block to be deposited in the carriage

23. (previously presented) A book printing and binding apparatus as set forth in Claim 21 wherein said vibrating mechanism is operatively associated with said tray such that the pages comprising the book block are vibrated so as to align the pages of the book block.

24. (previously presented) A book printing and binding apparatus as set forth in Claim 23 wherein said tray is supported in an angled orientation such that the vibrating mechanism exerts both horizontal and vertical vibrating forces on the book block held so as to aid in forming said book block.

25. (canceled)

26. (previously presented) Apparatus for the on demand printing and binding a perfect bound book, the latter comprising a book block having of a plurality of text pages with one edge of said book block constituting a spine, said book having a cover adhesively secured to said spine, said apparatus comprising:

a first text page printer for printing said text pages constituting a first book block of a first book to be printed on demand;

a cover printer for printing a cover corresponding to said first book;

means for receiving said text pages printed by said first text page printer and for accumulating said text pages so as to form said first book block;

a cover transfer conveyor for receiving a cover printed by said cover printer for said first book and for conveying said cover to a binding station;

a carriage movable along a workpath from a first station at which said carriage is in position to receive said first book block from said receiving means to an adhesive application station at which an adhesive is applied so as to be disposed between to the spine of said first book block and its respective said cover upon binding of said respective cover to said first book block;

said binding station having a clamp for clamping said cover to said book block proximate said spine so as to effect the adhesive binding of said cover to said book block;

a second text page printer for printing the text pages of a second book to be printed and bound on demand, said second text page printer being located along said workpath at a location separate from said first text page printer; ;

said apparatus further having a second means for receiving said text pages printed by said second text page printer for accumulating said text pages to form a second book block for said second book; ;

said cover printer printing a cover corresponding to said second book; ;

said cover transfer conveyor conveying said second cover to said binding station after binding of said first book is completed at said binding station; and

said carriage being movable to a position along said workpath for receiving said second book block from said second receiving means and said carriage thence being movable along said work path to said adhesive application station and thence to said binding station for being bound to said second cover.

27. (previously presented) Apparatus as set forth in Claim 26 further comprising a trimming station, the latter having a trimming blade for trimming said bound book to a predetermined finished size.

28. (canceled)

29. (previously presented) Apparatus as set forth in Claim 26 wherein said carriage conveys said book block with said cover bound thereto from said binding station to said trimming station.

30. (previously presented) Apparatus as set forth in Claim 29 further comprising a computer control system processing information relating to each of said books to be printed and bound including the size of the book, the number of pages in the book, and the excess margins of the bound book that must be trimmed to form a book of said predetermined finished size, said computer control system effecting operation of said first text page printer and of said cover printer to print the text pages and the cover of said first book to be printed on demand, effecting operation of said first receiving means so as to

transfer the text pages constituting said first book block for said first book to said carriage, effecting the transfer of the cover for such first book to the binding station, and said computer control system effecting movement of the carriage to said adhesive application, binding, and trimming stations.

31. (previously presented) Apparatus as set forth in Claim 30 wherein said computer control system effecting the printing of the text pages of a second book on said second text page printer while said first book is being printed and bound, said computer control system further effecting said cover printer to print a second cover for said second book after the cover for the first book has been transferred to said binding station, and said computer control system further effecting the transfer of said second book block from said second receiving means to said carriage after the first book has been transferred to said trimming station.

32. (previously presented) Apparatus as set forth in Claim 31 wherein after the book block for said second book has been transferred to said carriage, said computer control system effecting movement of said carriage to said adhesive application station for applying adhesive so as to be disposed between said spine of said second book block and its respective cover upon binding, said computer control system further effecting movement of said carriage to said binding station for binding of the cover for said second book to said second book block, and said computer control system further effecting

movement of said carriage to said trimming station for trimming of said second book to said predetermined finished dimensions.

33. (previously presented) Apparatus as set forth in Claim 32 wherein said first and second books may be of different sizes and thickness.

34. (previously presented) A method of on demand manufacturing a plurality of perfect bound books wherein each book manufactured may be of the same or of a different size and may have, within a limited range, the same or a different thickness, each book comprising a plurality of text pages constituting a book block and a cover wrapped around the front, back and one edge of said book block, said one edge constituting a spine, said method comprising the steps of:

commanding a first text page printer to print the text pages constituting a first book block for a first book to be printed;

accumulating said text pages to form said first book block for said first book;

moving said first book block along a work path, the later having an adhesive application station, a binding station, and a trimming station therealong;

printing a cover for said first book;

conveying said cover for said first book to said binding station and positioning said cover at said binding station so as to be substantially in register with said spine of said first book block when the latter is positioned at said binding station;

at said adhesive application station, applying an adhesive so as to be disposed between said spine of said first book block and its respective cover upon binding of the book;

moving said first book block to said binding station and stopping said first book block at said binding station with the spine of said first book block substantially in register with said first cover;

at said binding station, clamping said first cover to said first book block proximate said spine so as to adhesively bind said first cover to said first book block thereby forming a bound first book;

moving said bound first book from said binding station to said trimming station and transferring said bound first book to said trimming station; and

trimming any excess margins from said bound first book thereby to form a first book of a predetermined finished size.

35. (previously presented) The method of Claim 34 wherein said carriage transports said book block and said bound book along said work path, said method further comprising the steps of:

commanding a second printer to print the text pages constituting a book block for a second book;

accumulating said text pages to form said second book block;

upon transfer of said bound first book from said carriage to said trimming station, moving said carriage to a position for receiving said second book block;

printing a cover for said second book;

conveying said second cover to said binding station and positioning said second cover so as to be substantially in register with said spine of said second book block when the latter is positioned at said binding station;

moving said carriage with said second book block along said workpath to said adhesive application for having adhesive applied so as to be disposed between said spine and said second cover upon binding;

moving said carriage to said binding station and stopping said carriage at said binding station with the spine of said second book block substantially in register with said second cover;

clamping said second cover to said second book block proximate said spine so as to adhesively bind said second cover to said book block thereby forming a bound second book;

moving said bound second book from said binding station to said trimming station and transferring said bound second book to said trimming station; and

effecting operation of said trimming blade at said trimming station so as to trim any excess margins from said bound second book thereby to form a second book of a predetermined finished size.

36. (previously presented) A method of printing a book block having a plurality of text pages comprising the steps of:

- a. printing said text pages on a printer;
- b. discharging said pages from said printer;
- c. accumulating said pages as they are discharged from said printer so as to form a book block; and

d. upon the completion of a predetermined number of pages,
effecting the transfer of said book block to a carriage.

37. (previously presented) The method of Claim 36 wherein said pages are accumulated on a tray as they are discharged from said printer, said method further comprising a step of holding said pages relative to said tray as the latter is moved from a ~~its~~ receiving position in which it receives said pages from said printer so as to form said book block to a discharge position, and then releasing said book block so as to be discharged by gravity into said carriage.

38. (previously presented) The method of Claim 36 further comprising a step of jogging said pages as they are supported on said tray thereby to substantially align said pages comprising said book block relative to one another.

39. (previously presented) The method of Claim 38 further employing a cover printer for printing a cover for the book to be bound, said cover having a center portion, said method further comprising the additional steps of;

printing a cover on said cover printer corresponding to the book to be bound; and

positioning said cover relative to the book block at a binding station such that upon binding of said cover with said book block, the spine of said book block is adhered to the center portion of said cover.

40. (previously presented) A method of manufacturing a plurality of perfect bound books wherein each book manufactured may, within a limited range, be of a different size and have a different number of pages, each book comprising a plurality of text pages constituting a book block and a paper cover wrapped around the front, back and one edge of said book block, said one edge constituting a spine, said method comprising the steps of:

commanding the printing of text pages constituting a book block for a first book to be printed;

transferring said book block for said first book to a carriage;

moving said carriage along a work path, the later having an adhesive application station, a binding station, and a trimming station therealong;

at said adhesive application station, applying an adhesive to said spine of said book block;

printing a cover for said first book;

conveying said cover for said first book to said binding station and positioning said cover at said binding station so as to be substantially in register with said spine of said first book block when the latter is positioned at said binding station;

moving said carriage to said binding station and stopping said carriage at said binding station with the spine of said book block for said first book substantially centered with respect to said cover;

clamping said cover to said book block for said first book proximate said spine so as to adhesively bind said cover to said book block thereby forming a

bound first book;

moving said bound first book from said binding station to said trimming station and transferring said first bound book to said trimming station;

effecting operation of a trimming blade at said trimming station so as to trim ~~said~~ any excess margins from said first bound book thereby to form a first book of a predetermined finished size.

41. (previously presented) The method of Claim 40 further comprising the steps of :

commanding the printing of text pages constituting a book block for a second book to be printed where the size and the number of pages of said second book may vary widely from said first book;

transferring said book block for said second book to said carriage;

moving said carriage along said workpath to a position for receiving said book block for said second book ;

moving said carriage with said book block for said second book along said workpath to said adhesive application for having adhesive applied to the spine of said book block;

printing a cover for said second book;

conveying said cover for said second book from to said binding station and positioning said cover for said second book so as to be substantially in register with said spine of said book block for said second book when the latter is positioned at said binding station;

moving said carriage to said binding station and stopping said carriage at

said binding station with the spine of said book block for said second book substantially centered with respect to said cover for said second book;

clamping said cover to said book block for said second book proximate said spine so as to adhesively bind said cover to said book block thereby forming a second bound book;

moving said second bound book from said binding station to said trimming station and transferring said second bound book to said trimming station; and

effecting operation of a trimming blade at said trimming station so as to trim any excess margins from said second bound book thereby to form a second book of a predetermined finished size.

42. (previously presented) Apparatus for the printing and binding a perfect bound book, the latter comprising a book block having of a plurality of text pages with one edge of said book block constituting a spine, said book having a cover adhesively secured to said spine, said apparatus comprising a text page printer, a cover printer, a cover transfer conveyor for receiving said cover printed by said cover printer and for conveying said cover to a binding station, a carriage movable along a workpath from a first station at which said carriage is in position to receive said text pages constituting said book block to an adhesive application station at which an adhesive is applied to the spine of said book block, and to said binding station, the later having a clamp for clamping said cover to said book block proximate said spine so as to effect the adhesive binding of said cover to said book block so as to form a bound book, and a trimming station receiving

said bound book from said binding station and trimming said bound book to predetermined dimensions.

43. (previously presented) Apparatus as set forth in Claim 1 further comprising a second text page printer for printing the text pages of a second book, said second text page printer being located along said workpath at a location separate from said first text page printer, an accumulator receiving said text pages printed by said second text page printer and forming a book block for said second book, said cover printer printing a cover corresponding to said second book and said cover conveyor conveying said second cover to said binding station after binding of said first book is completed at said binding station, said carriage being movable to a position along said workpath for receiving said a book block for said second book and thence being movable along said work path to said adhesive application station for having said adhesive applied to said spine of said second book block and thence to said binding station for being bound to said second cover.
